

# Best Management Practices for Anthracnose Disease on Annual Bluegrass Putting Greens



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## Objectives:

*Trials were initiated in 2009 or 2010 to address the objectives of evaluating programmatic aspects of N fertility, topdressing, and cultivation that may impact anthracnose severity including 1) N source, 2) rate of summer N fertilization, 3) autumn and spring vs. summer topdressing, and 4) mid-season cultivation (grooming, verti-cutting, scarification, and solid tining).*

*Findings from these and other trials were used to initiate studies in 2012 with the objective (5) of determining the effect of best management practices (BMPs) on fungicide efficacy and playing quality of turf.*

Anthracnose, caused by *Colletotrichum cereale*, is a devastating disease of ABG turf throughout the United States and Europe. Previous research has shown that management practices significantly influence the severity of anthracnose; however, further research will enhance our understanding of how BMPs interact and effect fungicide efficacy and playing surface quality.

**Objective 1.** A study to determine the effect of N source on anthracnose severity was initiated in 2010. Five soluble-N sources (ammonium nitrate, ammonium sulfate, calcium nitrate, potassium nitrate, urea) were applied at 0.1 lb per 1000-ft<sup>2</sup> every week or biweekly during mid-season. In 2012, N applied weekly had significantly less disease compared to bi-weekly treatments, which was similar to results in 2010 and 2011. An N source by frequency interaction indicates that weekly application of potassium nitrate resulted in significantly less disease than all other treatments by the end of 2012, which was similar to previous years. Few differences were seen within biweekly source treatments, which is most likely due to insufficient N quantities.

**Objective 2.** Research to identify the optimum N rate for summer fertilization was completed September 2011. Results were provided in last year's summary and are being written for publication in a refereed journal.

**Objective 3.** A field trial was initiated in October 2010 to evaluate the impact of autumn, spring and summer topdressing programs on anthracnose severity. Results indicate that spring topdressing at 8 ft<sup>3</sup> per 1000-ft<sup>2</sup> provided a greater reduction in disease (all dates) than autumn topdressing at 8 ft<sup>3</sup> per 1000-ft<sup>2</sup> (11

of 14 dates). Topdressing at 4 ft<sup>3</sup> per 1000-ft<sup>2</sup> inconsistently reduced disease and to a lesser extent than 8 ft<sup>3</sup> per 1000-ft<sup>2</sup> regardless of timing. Biweekly topdressing (¼ or ½ ft<sup>3</sup> per 1000-ft<sup>2</sup>) during the summer did not affect disease until July 2012. This delay in response to summer topdressing probably indicates that these rates were too low to have an immediate impact on disease severity.

**Objective 4.** A trial examining the effect of scarification depth on anthracnose disease severity was completed in 2011. Results were reported in last year's summary and are being written for publication in a refereed journal. A second trial was initiated in 2011 to determine whether anthracnose severity was affected after verticutting. Our methodology to differentiate between defoliation injury and disease damage was refined in 2012; this study will be continued in 2013.

**Objective 5.** Two field trials were initiated in 2012 to investigate whether BMPs interact to effect fungicide efficacy, anthracnose severity, and playability of ABG turf.

Trial I examined the effects of mowing height, N fertility, and fungicide programming on anthracnose severity. Preliminary analysis indicates that all factors impact disease severity; however, N fertility and fungicide programming and the interaction between these factors accounted for most (~90%) of the disease response in this study. The interaction response indicates that it was possible to achieve acceptable disease control with reduced fungicide rates or fewer threshold-based applications of fungicides when greater N fertility was applied.

Figure 1. Trials were initiated in 2009 or 2010 to address the objectives of evaluating programmatic aspects of N fertility, topdressing, and cultivation that may impact anthracnose severity including 1) N source, 2) rate of summer N fertilization, 3) autumn and spring vs. summer topdressing, and 4) mid-season cultivation.



Trial II examined the effects of mowing height, N fertility, and sand topdressing on anthracnose severity and playability of ABG turf. Similar to trial I, preliminary analysis indicated that N fertility was the practice having the greatest impact on disease severity. Higher mowing and greater sand topdressing decreased disease but to a lesser extent than greater N. In contrast, mowing height accounted for 70% of the response in ball roll distance (BRD; Stimpmeter), while N fertility and sand topdressing had a much smaller impact on BRD, which would most likely be imperceptible to golfers.

### Summary Points

- Weekly applications of potassium nitrate reduced anthracnose severity compared to all other N sources; whereas, few differences were found between sources applied biweekly. Potassium nutrition and soil pH are being investigated as possible mechanisms involved in these N source effects.
- Spring topdressing had a greater and longer term reduction of anthracnose severity than autumn; autumn topdressing reduced anthracnose severity more than summer topdressing. Spring topdressing at 8 ft<sup>3</sup> per 1000–ft<sup>2</sup> provided the greatest suppression of disease.
- Research to–date indicated that there should not be a concern of verticutting increasing anthracnose severity. Thus, superintendents should not forego the benefits of vertical cutting on ABG turf.
- Greater N fertility (4.1 vs. 2.05 lbs per 1000–ft<sup>2</sup> annually) produced a substantially greater reduction in disease severity than either greater sand topdressing (24 vs. 9.5 ft<sup>3</sup> 1000–ft<sup>2</sup> annually) or higher mowing height (0.125 vs. 0.09 in). Greater N fertility also enabled fungicide inputs to be reduced (reduced rates or fewer threshold applications) while providing acceptable disease control.
- All combinations of cultural practices provided acceptable BRD (9.5–10.5 ft or greater) on 69% or more of the dates evaluated. Mowing height had the greatest effect on BRD while N fertility and sand topdressing effects on BRD would probably not be detectable by golfers (5 inches or less).